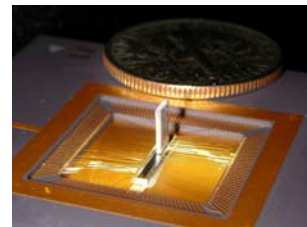
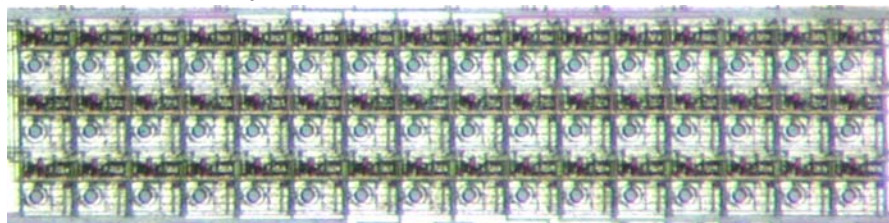


CMOS Geiger Photodiode GPD Arrays & SSPMs for Room Temperature Operation

Geiger Photodiode (GPD) pixels are photon-counting Geiger-mode silicon avalanche photodiodes that detecting and digitizing low light-level signals. Solid-state photomultipliers (SSPMs) are high-density arrays of GPDs made with inexpensive CMOS technology, can provide very high gain, for high sensitivity measurements, and the very fast time response needed for a variety of optical and nuclear detector applications.

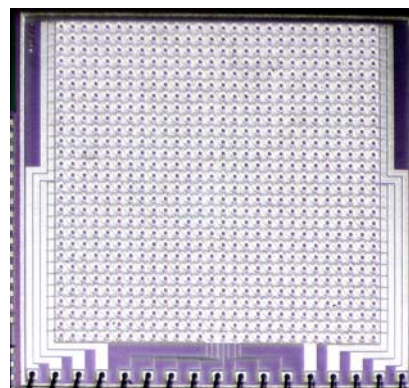


Features

- Single photon counting at room temperature (22 °C)
- High count rate (10 MHz+ actively quenched)
- Binary – Geiger – output
- Standard 144 pin ceramic PGA package

Devices

- Pixel Design 4 = higher nearIR detection efficiency
- Pixel Design 12 = isolated pixel design, lower noise, low pulse width
- AE183 = 32 pixel text array
- AE185 = different test pixels
- AE189 3X3 nine element arrays at pitch of 60,80,150 microns
- AE192 3x16 integrated actively quenched arrays
- AE193 Chip with improved quenching and 1x3 test arrays



Preliminary Specifications for Room Temperature Operation

Size (diameter in microns)	30 (10 to 60) microns
Peak Quantum Efficiency (QE) (no AR coat)	70%
Spectral range (nm) with QE & DE >10%	400-1000 nm
Breakdown Voltage (Volts)	27.1 V
Best Operating Voltage (Volts) for 632-nm Max[DE/σ _{dark}]	30.2 V
At Best Operating Voltage (BOV)	
DE (at 632 nm)	~20%
Dark Count Rate (Hz)	450 Hz (2 kHz typical)
Noise Equivalent Illumination per pixel	53 Hz (112 Hz typical)
Pixel Uniformity (% of geometric area with <10% signal variations)	(95%)
Actively-Quenched Maximum Count Rate (MHz)	10 MHz
After-Pulsing Multiplier	1.9